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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/871,642	06/04/2001	Tomonaga Yamamoto	392.1716	9776

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EXAMINER

ELKASSABGI, HEBA

ART UNIT

PAPER NUMBER

2834

DATE MAILED: 06/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/871,642

Applicant(s)

YAMAMOTO ET AL.

Examiner

Heba Elkassabgi

Art Unit

2834

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11/18/02.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 8-11 and 14 is/are rejected.
- 7) ☒ Claim(s) 5, 6, 7, 12, 13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

2. Claims 1,2,3,4,8, 9,10,11, and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The applicant does not disclose the reason as to why a curve is defined by a hyperbolic function in a full and clear manner

3. Claims 1,2,3,4,8,9,10,11, and 14 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure, which is not enabling. The applicant does not disclose why a hyperbolic function is essential to the practice of the invention and is not included in the claims to enable the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). The examiner suggests that the applicant disclose in the claims and the specification as to the reason why the curve of the hyperbolic function distinguishes the difference between the prior art and applicants invention. Now new matter is to be entered.

Art Unit: 2834

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1,2, 3, and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyata (J.P.02000350393A) and in further view of Abramowitz et al. (*Hand Book of Mathematical Functions with Formulas, Graphs, and Mathematical Tables*).

Miyata discloses in figures 5 a circular rotor with a plurality of magnetic poles (A) perpendicular central axis of the rotor (B) and that at least one magnetic pole (A) of the plurality of magnetic pole and more than one half of the outer periphery of the pole, a central part of the outer periphery of the one pole and an outer edge are defined by a curve of a function. However, Miyata does not disclose that the function is hyperbolic function.

Abramowitz et al. indicates that the hyperbolic function on page 83 indicates that a relationship between the sine, cosine, and tangent functions exist and they are derived from each other in which a relationship to a circular function where is clearly stated in page 83 equation 4.5.8 that $\cosh Z = \cos(iZ)$, where "i" is the imaginary complex. A combinations of exponential functions with negative powers can be made to fit any contour and can be replaced easily and corrected by a combinations of circular

Art Unit: 2834

functions of cos's and sin's as indicated by the "Handbook of Mathematical Functions" text as referred to above.

It would have been obvious to one of ordinary skill in the art to combine the structure of Miyata with the reference of Abramowitz et al.'s hyperbolic function increase torque in a motor from formulas that use sine, cosine, exponentials, or circular functions.

6. Claims 8,9,10,11 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyata (J.P.02000350393A) and in further view of Nitta et al. (J.P. 406217478) and Abramowitz et al. (Hand Book of Mathematical Functions with Formulas, Graphs, and Mathematical Tables).

Miyata discloses in figures 5 a circular rotor with a plurality of magnetic poles (A) perpendicular central axis of the rotor (B) and that at least one magnetic pole (A) of the plurality of magnetic pole and more than one half of the outer periphery of the pole, a central part of the outer periphery of the one pole and an outer edge are defined by a curve of a function. However, Miyata does not disclose that the function is hyperbolic and that a second region is defined on segments of straight lines and curves.

Nitta et al. discloses in Figure 3 that the second region is defined on segments of straight lines and curves, in order suppress cogging torque.

Art Unit: 2834

Abramowitz et al. indicates that the hyperbolic function on page 83 indicates that a relationship between the sine, cosine, and tangent functions exist and they are derived from each other in which a relationship to a circular function where is clearly stated in page 83 equation 4.5.8 that $\cosh Z = \cos(iZ)$, where "i" is the imaginary complex. A combinations of exponential functions with negative powers can be made to fit any contour and can be replaced easily and corrected by a combinations of circular functions of cos's and sin's as indicated by the "Handbook of Mathematical Functions" text as referred to above.

It would have been obvious to one of ordinary skill in the art to combine the structure of Miyata with the second curvature region of in order to suppress cogging torque and to combine the reference of Abramowitz et al.'s hyperbolic function increase torque in a motor from a formulas that use sine, cosine, exponentials, or circular functions.

Allowable Subject Matter

Claims 5,6,7/5,7/6, 12, and 13 are allowed.

Claims 5,6, 7/5, 7/6, 12, and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Art Unit: 2834

The following is a statement of reasons for the indication of allowable subject matter: Prior art does not indicate the specific formula that applicant is claiming. Prior art only indicates formulas other than the specific formulas of the applicant, which are able to achieve a hyperbolic graph when implemented.

Response to Arguments

Applicant's arguments with respect to claims 1-14 been considered but are moot in view of the new grounds of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Heba Elkassabgi whose telephone number is (703) 305-2723. The examiner can normally be reached on M-Th (6:30-3:30), and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on (703) 308-1371. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3431 for regular communications and (703) 305-3432 for After Final communications.


Application/Control Number: 09/871,642

Page 7

Art Unit: 2834

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

Heba Y. Elkassabgi
June 12, 2003



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